REMARKS

The Office Action dated October 30, 2008, and the Advisory Action dated December 30, 2008, have been reviewed and carefully considered. Claims 16-20 are added. Claims 16, 17, 19 and 20 are generic. Claim 18 is drawn to the invention elected, with traverse. Claims 1-20 are pending, claims 1 and 20 being the independent claims. Reconsideration of the application, as amended and in view of the following remarks, is respectfully requested.

Interview Recordation

Examiner Thomas called and spoke with David J. Rosenblum, attorney for Applicant, on January 9, 2009.

Attorney David Rosenblum proposed that, in allowed claim 6, the word "target" be substituted for "desired."

Examiner Thomas expressed possible reservations about having withdrawn claim rejections based on Viebranz et al. (US Patent 5,756,936) (hereinafter "Viebranz"), and suggested that this might affect the status of allowed claim 6.

In particular, Examiner Thomas pointed out that lines 20-21 of page 4 of the Applicant's specification indicate a syntactic foam, and that the Moore et al. (US Patent 4219791) (hereinafter "Moore") and Viebranz references also disclose a syntactic foam, which could affect the status of allowed claim 6.

Attorney Rosenblum said he would consider the significance of these references mentioning syntactic foam and reference to "foam" in the claims.

No agreement was reached at this interview.

A discussion of the Viebranz reference appears further below.

Claim Rejections

Item 2 of the Office Action withdraws the rejection, under 35 USC §112, second paragraph, of claim 7 and 8, based on the amendment immediately prior to the instant amendment. The rejection was based on lack of antecedent basis in the claim. However, the rejection is again stated in items 7 and 8 of the Office Action. Applicant believes that the immediately prior amendment addresses any lack of antecedent basis in the claim. Accordingly, the rejection is either withdrawn, or, Applicant believes, should be withdrawn.

Claims 1-4 and 13-15 stand rejected under 35 USC 102(b) as being anticipated by Negle (EP 1176856) (hereinafter "Negle '856").

Claim 1, as amended, recites:

> said insulating material has an electrical conductivity which is changed by adding said second material such that when said insulating material is used in the device, surface charge which gathers on the components of the device is substantially dissipated by increased electrical conductivity of said insulating material at least such that voltage flashovers are prevented between the components, and voltage drops that occur during operation remain below breakdown voltages of said insulating material

Support for claim 1 is found in the specification (e.g., page 2, lines 3-8, 21-24; page 3, lines 3-11, 28-31; page 6, lines 6-20; page 7, line 33 to page 8, line 3; and page 9, lines 13-16).

In the second sentence at the top of page 3, the Office Action states that "[i]nsofar as the presence of any additional filler material (e.g. in this case the microspheres described in para. 0029 [of Negle '856]) in any foam matrix can alter the overall electrical

properties of the composite material, the Examiner concludes that the properties alluded to in Claims 1 and 2 are inherently met."

The micro spheres in Negle '856 (or, equivalently, the paragraph between lines 23 and 35 of column 4 in US 6,498,303) are gas-containing bubbles that expand during heating in the production of the microporous high resistance foam. As more gas is taken on, the density of the foam decreases. The dielectric constant of the foam also decreases, because the component of gas in the foam increases.

Negle '856 features AC field control that lowers the dielectric constant of the foam to match that of the adjoining liquid insulator.

The AC field control ensures that "the electric field lines at the interface between the insulating member and the insulating liquid are not interrupted to any significant extent, thus avoiding the inherent negative surface effects such as the formation of space charges as well as tangential components of the field strength along the interface" (col. 2, lines 28-34).

The electrical resistance of the foam remains essentially constant during the heating, and the heating would not produce an embodiment that could substantially dissipate "surface charge which gathers on the components of the device." Therefore, Negle '856 fails to disclose or suggest, "adding . . . electrically conductive material."

Negle '856 further fails to disclose or suggest, "increased electrical conductivity."

Consequently, for at least the foregoing reasons, Negle '856 does not disclose or suggest:

> said insulating material has an electrical conductivity which is changed by adding said second material such that when said insulating material is used

> in the device, surface charge which gathers on the components of the device is substantially dissipated by increased electrical conductivity of said insulating material at least such that voltage flashovers are prevented between the components, and voltage drops that occur during operation remain below breakdown voltages of said insulating material

as in the present invention of claim 1.

For at least all of the above reasons, Negle '856 does not anticipate the present invention as recited in claim 1.

Reconsideration and withdrawal of the rejection is respectfully requested.

The Advisory Action (hereinafter "AA") states, "Further, Applicants's Specification seems to indicate that increasing the fraction of gas present in the foam composite would effectively lower the dielectric constant of the resulting material. . ."

This statement, so far, is correct.

However, the AA goes on to say that Applicant's specification therefore ". . . suggests that as the Negle ['856] spheres grow in diameter via heating, the more electrically conductive the prior art composite would become."

Applicant traverses this statement by the AA.

If the AA is suggesting that lowering the dielectric constant necessarily implies increasing electrical conductivity of a homogeneous or inhomogeneous material, the Applicant disagrees with such a conclusion.

The AA then suggests that the diameter of the Negle '856 spheres can be optimized ('303 patent, col. 4, lines 30-35).

It is true that the diameter can be optimized to, on the one hand, the extent of retaining sufficient electric strength while, on the other hand, achieving a dielectric constant low enough to sufficiently match that of the insulating liquid.

It is unclear to Applicant, however, how this fact might serve to advance the argument of the AA.

Fourth, the AA points out that the foam is formed "to ensure that . . . no negative surface effects . . . occur along the interface" between the foam and the insulating liquid, e.g., to prevent "formation of space charges . . . along the interface." The specific technique is to form the foam with a dielectric constant that matches that of the liquid insulator.

The AA suggests that this implies that the foam is "effective" in dissipating charge on the surfaces of components of a high voltage device.

The Negle '856 foam does not totally prevent the flow of charges, but the foam does not feature that:

> surface charge which gathers on the components of the device is substantially dissipated by increased electrical conductivity of said insulating material at least such that voltage flashovers are prevented between the components

Support for the amendment of claim 2 is found in the specification, (e.g., page 4, lines 22-23 and page 6, lines 13-16).

Claims 1-4, 13 and 14 stand rejected under 35 USC 102(b) as being anticipated by Moore et al. (US Patent 4219791) (hereinafter "Moore").

Claim 1, as amended, recites:

> the insulating material has an electrical conductivity constant which is changed by adding said second material such that when said insulating material is used in the device, surface charge which gathers on the components of the device is substantially dissipated by increased electrical conductivity of said insulating material at least such that voltage flashovers are prevented between the components

Moore is directed to field control of AC (col. 1, line 11: "A.C.") voltage loading so as to shift the dielectric stress (col. 1, line 12:"dielectric stress") from the insulator of higher dielectric constant to the adjacent insulator of lower dielectric constant (col. 1, lines 11-25).

Moore fails to disclose "adding" to achieve "increased electrical conductivity" such that "surface charge is substantially dissipated by increased electrical conductivity. . . at least such that voltage flashovers are prevented. . ."

The Office Action states, in item 10, that the "[Moore] binder has a dielectric constant which can be altered by the presence of the microspheres (col. 8, lines 30-35)."

The AA, which is discussed further above, seems to suggest that lowering the dielectric constant necessarily implies raising electrical conductivity.

Applicant traverses such an assumption.

Moreover, Applicant sees no foundation for concluding that Moore discloses or suggests that "surface charge is substantially dissipated by increased electrical conductivity. . . at least such that voltage flashovers are prevented. . ."

Consequently, for at least the above reasons, Moore fails to disclose or suggest:

> the insulating material has an electrical conductivity constant which is changed by adding said second material such that when said insulating material is used in the device, surface charge which gathers on the components of the device is substantially dissipated by increased electrical

> conductivity of the insulating material at least such that voltage flashovers are prevented between the components

as in the present invention of claim 1.

According to the above discussion, Moore fails to anticipate the present invention as recited in claim 1.

Reconsideration and withdrawal of the rejection is respectfully requested.

Claim 5 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Moore in view of Frantz et al. (US Patent 3670091) (hereinafter "Frantz").

Claim 5 depends from claim 2, which depends from base claim 1.

Frantz relates to the use of a somewhat flexible matrix, with gas-filled hollow phenolic or glass spheres dispersed throughout, for the relief of mechanical stresses on electrical components. See col. 1, lines 47-62. The flexible matrix does not appear to be used to either insulate or conduct electricity.

Frantz fails to make up for the shortcomings of Moore.

Frantz fails to disclose or suggest:

> the insulating material has an electrical conductivity constant which is changed by adding said second material such that when said insulating material is used in the device, surface charge which gathers on the components of the device is substantially dissipated by increased electrical conductivity of the insulating material at least such that voltage flashovers are prevented between the components

For at least these reasons, claim 5, which depends from claim 1, distinguishes patentably over Moore in view of Frantz.

Reconsideration and withdrawal of the rejection is respectfully requested.

Item 5 of the Office Action states that claims 7 and 8 stand rejected under 35 USC 103(a) as being obvious over Negle '856 in view of Allen et al. (US Patent 6541534) (hereinafter "Allen").

Claims 7 and 8 depend from claim 2, which depends from base claim 1.

Allen is directed to rigid polyurethane foams with glass or polymeric microspheres. The foams are used for mechanical reinforcement. See col. 1, lines 8-16(17); and col. 12, lines 44-57. Applicant is unable to find any reference to or hint of an electrical application in Allen. Accordingly, Applicant cannot see how Allen could serve to bridge the gap between Negle '856 and the present invention as recited in claim 1.

Allen and Negle '856, alone or in combination, do not disclose or suggest:

> the insulating material has an electrical conductivity constant which is changed by adding said second material such that when said insulating material is used in the device, surface charge which gathers on the components of the device is substantially dissipated by increased electrical conductivity of the insulating material at least such that voltage flashovers are prevented between the components

Reconsideration and withdrawal of the rejection is respectfully requested.

The first two sentences of item 13 of the Office Action suggest that claims 7 and 8 stand rejected under 35 USC 103(a) as being unpatentable over Moore in view of Allen.

Claims 7 and 8 depend from claim 2, which depends from base claim 1.

Allen is directed to rigid polyurethane foams with glass or polymeric microspheres. The foams are used for mechanical reinforcement. See col. 1, lines 8-16(17); and col. 12, lines 44-57. Applicant is unable to find any reference to or hint of an electrical application in Allen. Accordingly, Applicant cannot see how Allen could serve to bridge the gap between Moore and the present invention as recited in claim 1.

Moore and Negle '856, alone or in combination, do not disclose or suggest:

> the insulating material has an electrical conductivity constant which is changed by adding said second material such that when said insulating material is used in the device, surface charge which gathers on the components of the device is substantially dissipated by increased electrical conductivity of the insulating material at least such that voltage flashovers are prevented between the components

Reconsideration and withdrawal of the rejection is respectfully requested.

The first sentence of item 13 of the Office Action suggests that claims 7 and 8 stand rejected under 35 USC 103(a) as being unpatentable over Allen.

As discussed immediately above, Allen does not appear to relate to electrical insulation or conduction, and, for at least this reason, does not disclose or suggest an embodiment in which:

> the insulating material has an electrical conductivity constant which is changed by adding said second material such that when said insulating material is used in the device, surface charge which gathers on the components of the device is substantially dissipated by increased electrical conductivity of said insulating material at least such that voltage flashovers are prevented between the components

For at least the foregoing reasons, Allen does not render obvious the present invention as recited in claim 1.

Since claims 7 and 8 depend from claim 1, they likewise are not rendered obvious by Allen.

Reconsideration and withdrawal of the rejection is respectfully requested.

Prior Art Mentioned in Interview with Examiner

During the above-described interview on January 9, 2009 with the Examiner, the Examiner mentioned the Viebranz reference.

Viebranz relates to field control of AC voltage loading (col. 1, lines 35(36)-36(37): "provide for a uniform distribution of the electrical field"; col. 1, lines 58-62: " The dielectric layer at the inner side and the conductive portion are provided to effect a refractive field control, i.e., to make the field distribution relatively uniform in order to build up electrophysical conditions similar to that of the cable"; col. 2, lines 6-9; Summary of the Invention, first sentence: "medium voltages up to 15kV," i.e., (AC) power cable; col. 3, lines 8-16(17); col. 5, lines 38-42: "field equalizing effect"; col. 6, line 57 to col. 7, line 4; col. 8, lines 17-27) in the medium voltage range (Summary of the Invention, first sentence: "medium voltages up to 15kV," i.e., (AC) power cable; col. 2, line 66 - col. 3, line 2; col. 3, lines 8-17(18)). Viebranz discloses a resulting inner layer 14 having a specific resistance of at least $6x10^{13}$ Ωcm (col. 6, lines 16-19(20), 46, 53), which exceeds the preferred range of the specific resistance used in field control of DC voltage loading of the present patent application. See present application, page 6, lines 21-24; page 7, lines 1-4.

Manufacturing of the resulting sleeve, in Viebranz, is thereby simplified (col. 3, lines 21(22)-22(23)).

Viebranz fails to disclose or suggest a "high voltage insulating material" whose electrical conductivity is increased by adding a conductive material, so that the insulating material substantially dissipates surface charge to the extent of preventing voltage flashover.

None of the references of record, including Viebranz, alone or in combination, disclose or suggest:

> the insulating material has an electrical conductivity constant which is changed by adding said second material such that when said insulating material is used in the device, surface charge which gathers on the components of the device is substantially dissipated by increased electrical conductivity of said insulating material at least such that voltage flashovers are prevented between the components

Nor does Viebranz disclose or suggest, "A high voltage insulating material, comprising: a first material comprising a foam material; and an electrically conductive material distributed within the first material, said insulating material being contained in a casing of a high voltage device configured for insulating components of the device. . . such that voltage flashovers are prevented between the components."

During the January 9th interview with the Examiner, summarized above, the Moore and Viebranz references were mentioned as ones that might relate to syntactic foam.

However, neither reference can compensate for the deficiencies of the other, with respect to claim 1. For example, neither reference, nor their combination, discloses, features or suggests:

> the insulating material has an electrical conductivity constant which is changed by adding said second material such that when said insulating material is used in the device, surface charge which gathers on the components of the device is substantially dissipated by increased electrical conductivity of said insulating material at least such that voltage flashovers are prevented between the components

Moreover, there would have been no reason or motivation to combine the two references in the manner the Office Action suggests.

In particular, Moore is directed to lowering the dielectric constant of field control material (col. 2, lines 50-61(62); col. 3, lines 25-28, 47-52) to accommodate a gaseous

insulation; whereas, Viebranz focuses on raising the dielectric constant of field control material (col. 3, lines 11(12)-16(17); col. 6, lines 20(21)-22(23)) to simplify manufacture of a sleeve for splicing together cables (col. 3, lines 21(22)-22(23)). In addition, and as discussed above, for each reference, the field control is of AC loading, not DC loading. For at least the above reasons, it would not have been obvious to implement one of the references in view of the other.

For at least all of the above reasons, the prior art of record, alone or in combination, fails to disclose, feature or suggest:

> a high voltage insulating material, comprising: a first material; and a second material distributed within the first material, said insulating material being contained in a casing of a high voltage device configured for insulating components of the device; wherein said insulating material has an electrical conductivity which is changed by adding said second material such that when said insulating material is used in the device, surface charge which gathers on the components of the device is substantially dissipated by increased electrical conductivity of said insulating material at least such that voltage flashovers are prevented between the components, and voltage drops that occur during operation remain below breakdown voltages of said insulating material

Claim 1 is therefore believed to be patentable over the prior art of record.

Amendment of Withdrawn Claims

Support for the amendment of claims 9 and 10 is found in the specification, (e.g., page 7, line 33 to page 8, line 15).

Support for the amendment of claims 11 and 12 is found in the specification, (e.g., page 8, lines 28-31).

New Claims

Support for new dependent claim 16 is found in the specification, (e.g., page 4, lines 20-23).

Support for new dependent claim 17 is found in the specification, (e.g., page 6, lines 21-24).

Support for new dependent claim 18 is found in the specification, (e.g., page 4, lines 20-21).

Support for new dependent claim 19 is found in the specification, (e.g., page 6, lines 13-16).

New claim 20 is a process claim analogous to composition claim 1, and is deemed to patentably distinguish over the prior art of record for at least the same reasons set forth above with regard to claim 1.

CONCLUSION

In view of the above, it is respectfully submitted that the present application is in condition for allowance. All issues raised by the Examiner having been addressed, an early and favorable action on the merits is earnestly solicited.

The Director is hereby authorized to charge any fee which may be required, or credit any overpayment, to Deposit Account No. 50-3960.

Respectfully submitted,

Dated: January 15, 2009

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